BEHAVIOUR OF POLYCRYSTALLINE Al-Cu-Fe ICOSAHEDRAL QUASICRYSTAL IN FRICTION TEST

K. E. Grinkevych*, D. V. Lotsko, Z. P. Shurygina, S.S.Ponomarev, O.I.Bykov

I.M. Frantsevych Institute for Problems of Materials Science (IPMS) of National Academy of Sciences of Ukraine, 3 Krzhizhanovsky str., 03142 Kiev, Ukraine

Abstract

The behavior of a sample of AlCuFe icosahedral quasicrystal with dry friction and friction with lubricants including ones containing additions of superdisperse carbon has been investigated. The sample was produced from the water-atomized powder by sintering under a high quasihydrostatic pressure. The multipass friction test was carried out with the Si_3N_4 friction partner in a device CATC (Computer Assistant Tribology Complex) developed in the IPMS. The lowest values of wear and friction coefficient (about 10 times lower than for dry friction) were observed when using as liquid paraffin a lubricant. The influence of carbon additions to this lubricant strongly depended on its form (amorphous carbon, graphite, diamond). Only diamond additions lowered the friction coefficient with increasing the amount of smooth areas in friction tracks. We suppose that it may be connected with a stress-induced phase transformation.

Keywords

Quasicrystal, friction, lubricant, carbon